SEMESTER – III

THEORY SUBJECTS

Sl. No.	Sub. Code	Theory	Contact Hours			Credit
			L	T	P/S	
1.	22AR313	Structural Analysis	**3**	**0**	**0**	**3**

Course Objective	To understand simple structural concepts and behaviour. With the acquired knowledge of statically equilibrium of forces the course aims at teaching methods to determine effect of loads on members of different determinate structures and give additional knowledge of deformation of structures to solve indeterminate structures. To familiarize the student with the effects of transverse forces such as shear force and bending moment in beams; determination of SF and BM in simple beams under different loading systems; and understanding of strength and forces in columns and arches
Anticipated Learning Outcomes:	To demonstrate an understanding of concepts taught during the semester through simple calculations and models.
Module 1 Beams: types and properties	Introduction to determinate and indeterminate structures, Different types of loads acting on a structure Types of beams, its behaviour, types of supports and reactions, bending moment and shear forces; simply supported, cantilever and overhanging beams, relation between bending moment and shear force. Explaining with Bending moment and Shear force diagram.
Module 2 Bending and shear forces	Shear force and bending moment for fixed and continuous beams, application of Clapperayon's theorem of three moments. Moment distribution method. Determination of members of forces in determinate trusses and simple frames.
Module 3 Deflection	Relation between slope, deflection and curvature, double integration method, three moment theorems, deflection by

	conjugate beam method. Application to simple cases including overhanging beams.
Module 4 Columns	Types of columns, columns and struts, buckling and crushing failure, Euler's theory, equivalent length and slenderness ratio, Rankine's formula.
Module 5 Arches	Determination of horizontal thrust, radial shear and normal force, axial thrust, bending moment and shear force for three-hinged arch. Structural concepts in post and lintel, arch, dome, and vault construction.

Note: Most Architectural subjects do not have Textbooks. The Reference books mentioned below are for reference only and University question paper should be prepared from the Syllabus descriptions.

References

1. *Junnarkar, S. B. (1991). Mechanics of Structures. Vol. 1. 20th Ed. Delhi: Charotar.*
2. *Kurmi, R. S. Strength of Materials. New Delhi: S. Chand and Company.*
3. *Mukherjee, S. Elements of Engineering Mechanics. New Delhi: PHI Learning.*
4. *Ramamrutham, S. (2008). Engineering Mechanics: A Textbook of Applied Mechanics. Dhanpat Rai Publishing.*
5. *Vazirani and Ratwani. (2008). Analysis of Structures. Vol. I. New Delhi: Khanna Publishers.*
6. *Gere, J. M and Timoshenko, S. P., Mechanics of Materials, CBS Publishers and Distributors.*